CLAIMS

1. An organic semiconductor device comprising a substrate, an organic semiconductor, a gate insulating film and conductors, wherein a polymer layer, which is different from the gate insulating film, is provided in contact with the organic semiconductor, and the polymer layer contains a copolymer of methyl methacrylate and divinylbenzene.

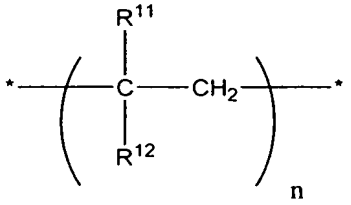
2. The organic semiconductor device according to claim 1, wherein the copolymer of methyl methacrylate (A) and divinylbenzene (B) has a monomer unit ratio of A:B = 1:0.001 to 0.04.

3. The organic semiconductor device according to claim 1 or 2, wherein the polymer layer has a thickness of 5 nm or more and 30 nm or less.

4. The organic semiconductor device according to any one of claims 1 to 3, wherein the polymer layer is provided between the organic semiconductor and the gate insulating film, and the gate insulating film has a surface with a surface roughness Ra of 5 nm or less, the surface being in contact with the polymer layer.

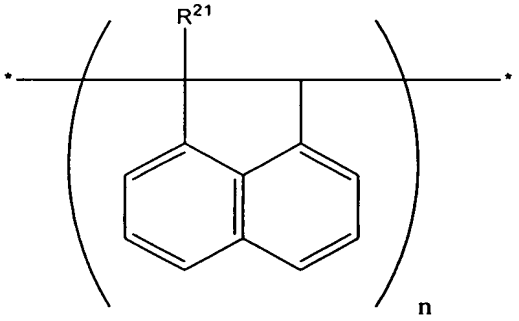
5. An organic semiconductor device comprising a substrate, a organic semiconductor, a gate insulating film and conductors, wherein a polymer layer, which is different from the gate insulating film, is provided in contact with the organic semiconductor,

and the polymer layer contains a polymer represented by the following formula (1) or (2):



(1)

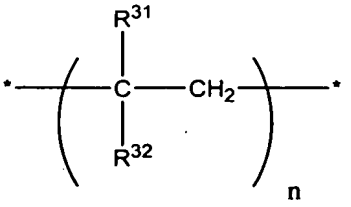
wherein $R^{11}$ represents a hydrogen atom or an alkyl group, $R^{12}$ represents a naphthyl group which may be substituted, a carbazoyl group which may be substituted, or a biphenyl group which may be substituted, and n denotes polymerization degree; or



(2)

wherein $R^{21}$ represents a hydrogen atom or an alkyl group, the aromatic ring may be substituted, and n denotes polymerization degree.

6. The organic semiconductor device according to claim 5, wherein the polymer layer contains a polymer represented by the following formula (3):



(3)

wherein $R^{31}$ represents a hydrogen atom or an alkyl group, $R^{32}$ represents a naphthyl or carbazoyl group, and n denotes polymerization degree.

7. The organic semiconductor device according to claim 5 or 6, wherein the polymer layer has a thickness of 10 nm or more and 100 nm or less.

8. The organic semiconductor device according to any one of claims 1 to 7, wherein a gate electrode, the gate insulating film, the polymer layer, the organic semiconductor and source/drain electrodes are provided on the substrate in this order.

9. The organic semiconductor device according to any one of claims 1 to 7, wherein a gate electrode, the gate insulating film, the polymer layer, source/drain electrodes and the organic semiconductor are provided on the substrate in this order.

10. The organic semiconductor device according to any one of claims 1 to 7, wherein a gate electrode, the gate insulating film, source/drain electrodes, the polymer layer and the organic semiconductor are provided on the substrate in this order.

11. The organic semiconductor device according to any one of claims 1 to 7, wherein a gate electrode, the gate insulating film, one of source/drain electrodes, the organic semiconductor and the other of the source/drain electrodes are provided on the substrate in this order, and wherein the polymer

layer is provided in contact with the organic semiconductor.

12. The organic semiconductor device according to any one of claims 1 to 7, wherein source/drain electrodes, the polymer layer, the organic semiconductor, the gate insulating film and a gate electrode are provided on the substrate in this order.

13. The organic semiconductor device according to any one of claims 1 to 7, wherein the polymer layer, source/drain electrodes, the organic semiconductor, the gate insulating film and a gate electrode are provided on the substrate in this order.

14. The organic semiconductor device according to any one of claims 1 to 7, wherein the polymer layer, the organic semiconductor, source/drain electrodes, the gate insulating film and a gate electrode are provided on the substrate in this order.

15. The organic semiconductor device according to any one of claims 1 to 7, wherein one of source/drain electrodes, the organic semiconductor, the other of the source/drain electrodes, the gate insulating film and a gate electrode are provided on the substrate in this order, and wherein the polymer layer is provided in contact with the organic semiconductor.

16. The organic semiconductor device according to any one of claims 1 to 15, wherein the polymer

layer is formed by any one of spin coating, spray coating and dip coating.

17. The organic semiconductor device according to any one of claims 1 to 16, wherein the device is a field effect transistor.

18. An organic semiconductor apparatus using the organic semiconductor device according to any one of claims 1 to 17.

19. A process for producing an organic semiconductor device, comprising the steps of:

forming an insulating film on a substrate having a surface, at least a part of the surface being conductive,

forming a polymer layer composed of a copolymer of methyl methacrylate and divinylbenzene on the insultating film, and

forming an organic semiconductor layer on the polymer layer.

20. The process for producing the organic semiconductor device according to claim 19, further comprising a step of forming at least one pair of electrodes apart from each other on a part of the polymer layer.

21. The process for producing the organic semiconductor device according to claim 19, further comprising a step of forming at least one pair of electrodes apart from each other on a part of the

organic semiconductor layer.

22. A process for producing the organic semiconductor device, comprising the steps of:

forming a polymer layer composed of a copolymer of methyl methacrylate and divinylbenzene,

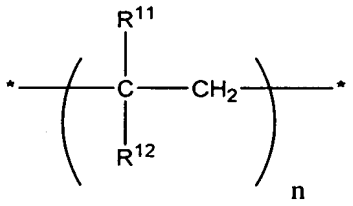
forming an organic semiconductor layer on the polymer layer, and

forming an insulating film on the organic semiconductor layer.

23. A process for producing the organic semiconductor device, comprising the steps of:

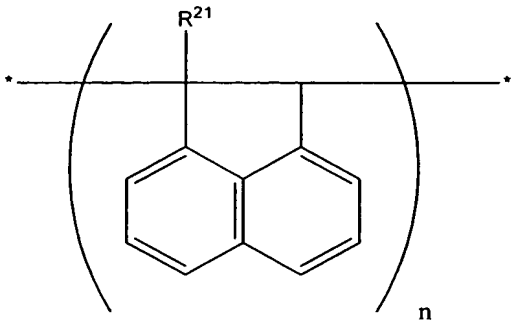
forming an insulating film on a substrate having a surface, at least a part of the surface being conductive,

forming, on the insulating film, a polymer layer composed of a polymer represented by the following formula (1) or (2):



(1)

wherein $R^{11}$ represents a hydrogen atom or an alkyl group, $R^{12}$ represents a naphthyl group which may be substituted, a carbazoyl group which may be substituted, or a biphenyl group which may be substituted, and n denotes polymerization degree; or



(2)

wherein $R^{21}$ represents a hydrogen atom or an alkyl group, the aromatic ring may be substituted, and n denotes polymerization degree, and

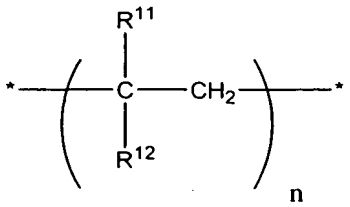
forming an organic semiconductor layer on the polymer layer.

24. The process for producing the organic semiconductor device according to claim 23, further comprising a step of forming at least one pair of electrodes apart from each other on a part of the polymer layer.

25. The process for producing the organic semiconductor device according to claim 23, further comprising a step of forming at least one pair of electrodes apart from each other on a part of the organic semiconductor layer.

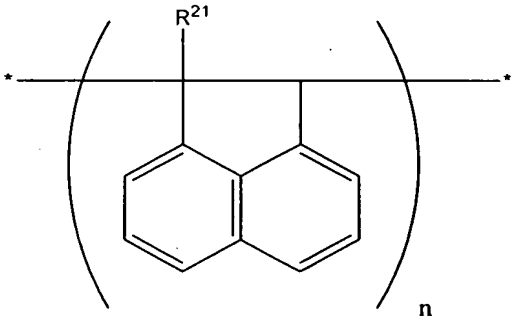
26. A process for producing the organic semiconductor device, comprising the steps of:

forming, on a substrate, a polymer layer composed of a polymer represented by the following formula (1) or (2):



(1)

wherein $R^{11}$ represents a hydrogen atom or an alkyl group, $R^{12}$ represents a naphthyl group which may be substituted, a carbazoyl group which may be substituted, or a biphenyl group which may be substituted, and n denotes polymerization degree; or



(2)

wherein $R^{21}$ represents a hydrogen atom or an alkyl group, the aromatic ring may be substituted, and n denotes polymerization degree,

forming an organic semiconductor layer on the polymer layer, and

forming an insulating film on the organic semiconductor layer.

27. The process for producing the organic semiconductor device according to any one of claims 19 to 26, wherein the polymer layer is formed by any one of spin coating, spray coating and dip coating.